U.S. Patent Office
AUG 19 1955
Design Division

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Bausch & Lomb Dynoptic Metallurgical Microscopes

Bausch & Lomb

Dynoptic

Metallurgical Microscopes

Free the Metallograph for solution of highly complex problems—with no sacrifice in convenience or dependability. Provide a simple, precise, smoothly functioning tool for—

- Developing new and stronger alloys for specific applications
- Maintaining highest quality standards
- Investigating customer problems
- More effective student instruction
- And many other uses!

MODEL DM

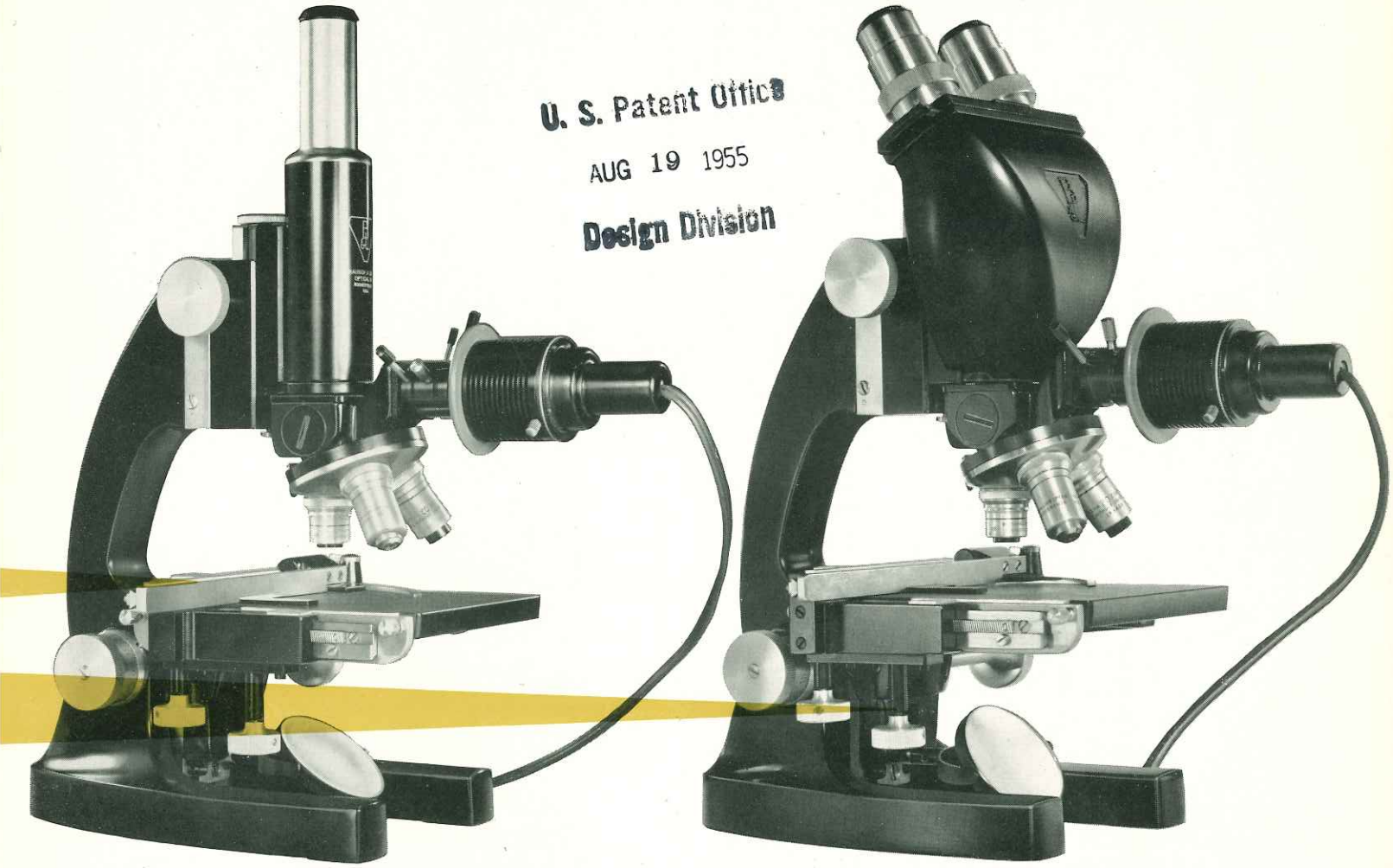
MODEL DMET

Highest efficiency is easily achieved in applications requiring the examination of metal specimens and other opaque objects, with this equipment. Even your most difficult determinations will be performed with routine regularity and simplicity. B&L Metallurgical Microscopes function with a smoothness and precision that guarantee economy and pleasure of operation throughout many years of hard use. Optical elements are the finest in the world, ground and polished to tolerances of a fraction of a light wave. The user of these instruments will always be certain of obtaining images that are exceptionally sharp and clear, so that the evidence he seeks in an examination is instantly visible and quickly interpreted.

When used with a suitable photomicrographic camera, the Model DM is used to advantage in making permanent photographic records, or when it is desirable to view the projected image on a ground glass, as in grain size determination.

Uninterrupted Examinations with Triple Revolving Nosepiece

The proper combination of objectives can be chosen for the nosepiece which will permit examinations to proceed without delaying to change objectives. The Roto-sphere Ball-bearing nosepiece revolves easily and smoothly with an absolute minimum of friction. Bearings are located around the perimeter of the nosepiece to perfectly distribute the weight throughout the entire circumference. A compen-



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sator distributes the pressure to all bearing points, cancelling possible wear. Precise positioning of the objective is assured by a positive ball-stop. Exact repeats will be certain throughout a long lifetime of service.

Conveniently Operated, Low Position Fine Adjustment

The slightest movement of the fine adjustment focusing knob is instantly converted to vertical travel of the objective. Friction-free, wear-resistant and effortless, this focusing mechanism minimizes operator fatigue and encourages thorough, complete and accurate examinations. The large, easily grasped knob has one micron divisions, convenient in estimating the height of surface characteristics.

Only "three fingers" above the table top, the fine focusing knob permits resting the hand on the table throughout examinations. The operator works in a non-tiring position with his hand supported, his arm relaxed to make the tiniest possible change in focus a routine matter.

The ball-bearing carrying the fine adjustment shaft is the radial thrust type that not only assures a lifetime of effortless motion but eliminates backlash—when you stop turning the knob your focus stays just where you leave it.

Both wandering out-of-focus and binding are avoided by the design of the fine adjustment slide which travels on specially selected pre-loaded ball-bearings in precision ground, hardened steel raceways.

Coarse focusing is also accomplished with equal ease

Near right — Model DM with accessory lens in place on the illuminator for use with an external light source.

Far right—Model DMETR with Tri-Vert Illuminator provides extreme versatility of illumination.

and sureness. The precisely fitted rack and pinion coarse focusing mechanism guarantees immediate, positive movement. There is no "lost motion" due to "play" in gear teeth.

Versatile Operation with Focusing Stage

The stage is adjustable through an extensive range to permit easy accommodation of larger specimens. It is also oversize (116mm x 141mm) so that the larger specimens can be quickly and securely positioned for examination.

The stage is focusable by an extra-wide, sturdy rack and pinion, functioning in precisely aligned ways. This not only makes it possible to handle specimens of considerable depth, but also permits the specimen to be brought into focus without disrupting the alignment of the vertical illuminator with an independent light source. The small amount of fine focusing that may be necessary is not sufficient to disturb lighting alignment.

Two stage plates are supplied as standard equipment. One is solid for use with opaque specimens; the other has a 7/8" aperture for transmitted light work. These are easily and quickly interchanged. The under side of the stage is drilled and tapped to accept a "Verti-Slide" type variable focus condenser, or an Abbe Condenser in a spiral focusing mount, for transmitted light use.

Image Quality Unaffected by Normal Vibration or Shock

The microscope stand is of extremely sturdy construction with the weight distributed to provide a high degree of stability. This eliminates the annoying occurrence of image flutter caused by machinery in operation close to the microscope, the dropping of heavy objects, etc.

Fine Detail Clearly Visible with Vertical Illumination

The convenience of the multiple objective turret on both the Model DM and Model DMET, in combination with the versatile B&L Vertical Illuminator assures speedy, efficient, accurate examination.

The reflecting system utilizes a plano, coated glass reflector. For brilliance, and to reduce disturbing reflection, this reflector is vacuum filmed on both surfaces, giving better visibility at high magnification and reducing exposure in photomicrography. Easily positioned, it also provides oblique illumination and is useful in viewing non-metallic fibrous materials.

Complete control is maintained over illuminating rays by using field and aperture diaphragms and, if desired, an adjustable transformer to adjust lamp brilliance. The field diaphragm reduces stray light by restricting illumination to the area under observation.

The aperture diaphragm aids in matching the N.A. of each objective for greatest efficiency. A slot between the field and aperture diaphragm receives a green filter for changing specimen contrast, or a Polaroid Polarizer for observations under polarized light. A cap analyzer, used with the polarizer slips over the microscope eyepiece.

The lamphouse with its cooling fins, contains a powerful, pre-centered lamp for maximum efficiency and a frosted condensing lens for uniform illumination. The lamphouse may be removed to allow using the illuminator with an external light source.

Full Utilization of Light From External Illuminators

To eliminate light loss and assure filling the aperture when external light sources are used for photomicrography, a supplementary lens can be quickly screwed onto the end of the Vertical Illuminator in place of the lamphouse.

This new supplementary lens permits the light source to be moved approximately 7 inches away from the microscope, preventing heat damage to the camera bellows and providing ample space for the introduction of any desired accessory equipment.

Maximum Light Transmission Provided by Balcoted Optical Elements

Both the Model DM and Model DMET are regularly supplied with Balcoted objectives and untreated eyepieces. Treated eyepieces are available, however, and are listed in the specifications. Balcoting, particularly of objectives, results in clearer, sharper visual and photomicrographic images of metal specimens, especially those with long tone range, low reflecting power and low contrast, such as cast iron, manganese bronze, and cast steel.

Fluorite and Apochromatic objectives are available in addition to the complete range of powers in the Achromatic series. These are all corrected for uncovered objects and 215mm tube length, and are parfocal.

For work with polarized light and the vertical illuminator, Polaroid accessories are available. The polarizer fits in the filter slot and a cap analyzer, alone or with quarter wave and red of the 1st order retardation plates, is used over the eyepiece.

Huygenian eyepieces are suitable for use with Achromatic and Fluorite objectives. Hyperplane eyepieces are recommended for use with medium and high power Achromatic and Fluorite objectives. Compensating eyepieces are used with Apochromatic objectives. Powers to meet every requirement are listed.

Readily Adaptable to your Particular Needs

To permit you to choose the instrument best suited to your particular requirements and budget and still be in a position to adequately meet future requirements, monocular and binocular bodies are available to be used interchangeably on both the Model DM and Model DMET. The monocular tube of the Model DM can be replaced by a binocular body for the fatigue-free viewing the latter affords over extended observation periods. Or, the binocular body of the Model DMET can be replaced by a monocular body for work in photomicrography and measuring. This interchangeability is accomplished merely by loosening a thumbscrew on the top of the microscope arm — field position is not disturbed.

Illumination is always in complete balance between the two sides of the binocular body. Prism mounts are extremely strong to insure that prisms will remain in alignment and the two images perfectly superimposed.

Adjustment for interpupillary distance is made speedily and accurately by means of a knurled adjusting ring which moves both eyepiece tubes. A millimeter scale enables the observer to select his correct adjustment at any time merely by setting to the known scale reading. And, because the eyepieces are parallel, the setting for interpupillary distance does not change, no matter which length eyepiece is used.

To compensate for the difference in visual acuity between the eyes, one eyepiece of the binocular body has a focusing collar to permit independent focusing of that eyepiece.

Extra Dividends with The Tri-Vert Illuminator

Extensive versatility in types of illumination is afforded by this illuminator, which makes it possible to do highly satisfactory work with opaque or semi-opaque specimens in bright field, dark field, and polarized light. It is quickly and easily attached to either model, and is a simple, complete unit—there are no "extras."

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A standard quadruple nosepiece is used to accommodate the objectives, which are 8×, 10×, 20×, and 40×. The patented Tri-Vert objectives are mounted in an illuminating cell of transparent plastic.

The light source is a 6.5 volt, 2.75 ampere lamp, having a straight, compact coil filament and fitted into a pre-focused base in the removable socket.

Two models of B&L Dynoptic Metallurgical Microscopes are available with the Tri-Vert Illuminator as standard equipment. These are the Model DMTR (monocular tube) and the Model DMETR (binocular body).

Specimens Easily and Precisely Positioned with the Mechanical Stage

Available as optional equipment, the mechanical stage assures valuable time-saving and precision operation. It is quickly fastened to the microscope stage with two convenient knurled screws and permits easy, accurate relocation of particular sections of a specimen, systematic searching of specimens, and linear measurement of specimen detail. Graduations are in millimeters and verniers reading to tenths of a millimeter. The mechanical stage is also available without graduations, at a lower cost.

Where used, the mechanical stage is subjected to considerable movement. The metals used in the construction of the B&L mechanical stage reduce wear to a negligible degree. Should some slight play develop between rack and pinion gear teeth, the operator is provided with the means to compensate for it quickly and easily, by a simple adjustment. Straight line action is always assured when moving a specimen, eliminating the annoying occurrence of a field moving out of the zone of observation.

The vacuum-spring slide holder exerts just enough pressure, downward, sideways and back to keep the slide in the proper position.

Control knobs are below the stage and in line with the right hand fine focusing knob. Knobs are screwed on the pinions, and set screws permit pressure adjustment to suit different operators. Comfortable operation induces better examinations, especially those extended ones with much shifting of the slide and refocusing.

SPECIFICATIONS

MICROSCOPES

Catalog No.	Description
31-20-66-37	DM Metallurgical Microscope with monocular body; vertical illuminator; triple revolving nosepiece; illuminating unit with 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., A.C.; one 8X, one 20X, and one 40X Balcoted achromatic objectives; one 7.5X and one 12.5X huygenian eyepiece; complete in carrying case.
31-20-68-37	DMET Metallurgical Microscope with inclined binocular body; vertical illuminator; triple revolving nosepiece; illuminating unit with 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., A.C.; one 8X, one 20X, and one 40X Balcoted achromatic objectives; two paired 7.5X and two paired 12.5X huygenian eyepieces; complete in carrying case.
31-20-66-38	DMTR Metallurgical Microscope with monocular body; fitted with Tri-vert Illuminator having a quadruple nosepiece; yellow, green and blue filters; polaroid polarizer and cap analyzer; 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., 60 cycle A.C.; one 8X, one 10X, one 20X and one 40X Balcoted achromatic Tri-vert objectives; one 7.5X and one 12.5X huygenian eyepieces; complete in carrying case.
31-20-68-38	DMETR Metallurgical Microscope with inclined binocular body; fitted with Tri-vert Illuminator having a quadruple nosepiece; yellow, green, and blue filters; polaroid polarizer and cap analyzer; 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., 60 cycle A.C.; one 8X, one 10X, one 20X and one 40X Balcoted achromatic objectives; two paired 7.5X and two paired 12.5X huygenian eyepieces; complete in carrying case. NOTE: Balcoted huygenian eyepieces are available at extra cost. The price differential is easily determined by comparing Balcoted huygenian eyepieces and those without Balcoting, in the price list.

ACCESSORIES

Catalog No.	Description
31-34-86	Compensating Lens, for adapting 31-34-82 for use with 160mm. tube length microscope.
31-19-37	Monocular body.
31-19-97	Inclined binocular body.
31-34-95	Polaroid Polarizer.
31-57-11	Polaroid Cap Analyzer.
31-57-45	Retardation Plate-Red 1st order, fits Cap Analyzer.
31-57-44	Retardation Plate-¼ wave, fits Cap Analyzer.
31-59-67-01	Mechanical Stage, graduated, in case.
31-59-66-01	Mechanical Stage, ungraduated, in case.
31-16-89	Stage Micrometer with scale ruled to 0.001".
31-16-90	Stage Micrometer with scale ruled to 0.1mm. and 0.01mm.
42-34-71	Micrometer Eyepiece, reads directly in thousandths of an inch on specimen.
31-16-50	Filar Micrometer Eyepiece (with case — add $3.00).
42-34-68	Grain Size Measuring Eyepiece.
33-16-02-04	Interference Microscope Objective, 10X, with 10% and 20% test plates. NOTE: The 42-34-71 Micrometer Eyepiece is designed for use with 8X objective and monocular body tube.

VERTICAL ILLUMINATOR

Catalog No.	Description
31-34-82-01	Vertical Illuminator with coated and aluminized reflector for full and half aperture illumination; field and aperture diaphragms, and filter mounted in side tube; triple revolving nosepiece.
31-34-85	Accessory lens to fit 31-34-82-01 Vertical Illuminator for external illumination.
31-33-32-11	Illuminating Unit for Vertical Illuminator only, with 6.5-v., 25.5 c.p. lamp in housing; adjustable transformer for 115-v., A.C.
31-33-32-12	Illuminating Unit for Vertical Illuminator only, same as above but with fixed transformer for 115-v., 60 cycle A.C., in place of adjustable transformer.
31-34-94	Green Filter for 31-34-82-01 Vertical Illuminator.
31-34-92	Blue Filter for 31-34-82-01 Vertical Illuminator.
31-31-79	Lamp, 6.5-v., 25.5 c.p., 2.75 amps., precentered, prefocused and preoriented.
31-36-44	Rheostat, 115-v., A.C. or D.C. for 6.5-v. lamp.
31-36-47	Fixed Transformer, 115-v., 60 cycle A.C. for 6.5-v. lamp.
31-36-45	Adjustable Transformer, 115-v., 60 cycle A.C. for 6.5-v. lamp.

INDEPENDENT LIGHT SOURCES

Catalog No.	Description
42-44-42-65	Illuminating Unit on Pedestal Base for vertical, oblique, or substage illumination with inclination joint, water cell and filter holder, including 6-v. ribbon filament illuminator and transformer for 115-v., 60 cycle A.C.
42-46-97	Transformer, 6-v., 18 amp. (108-watt) capacity for 115-v., 60 cycle A.C.
42-46-98	Transformer, same as above but for 230-v.
42-46-91	Transformer, same as above but for 115-v., 25 cycle.
42-44-85-65	Illuminating Unit, same as 42-44-42-65 above, except with clock feed arc illuminator and 4.5 amp. resistance for 115-v., D.C.
42-46-52	Resistance, 4.5 amp., 115-v., D.C.
42-46-53	Resistance, 4.5 amp., 230-v., D.C.
42-46-57	Resistance, 8 amp., 115-v., A.C. or D.C.
42-47-22-28	Water Cell and Support with holder for 2″ Wratten Filters for above units.
42-42-36	Lamp, 6-v., 108-w. ribbon filament.

SOFT CORED CARBONS

Catalog No.	Description
41-42-72-73	5.6 and 8mm. diameter, 6″ long.
41-42-64	6.4mm. diameter, 6″ long, A.C.

ACHROMATIC OBJECTIVES

Cat. No.	Magnification	N.A.	Working Distance in Millimeters
42-33-51	5	0.10	2.40
42-33-52	8	0.20	14.2
42-33-53	10	0.25	10.6
42-33-54	20	0.40	2.8
42-33-55	25	0.50	1.8
42-33-56	40	0.65	0.91
42-33-57	50	0.85	0.38
42-33-58	75	1.25 (oil)	0.30

FLUORITE OBJECTIVES

42-33-70	50	0.85	0.39
42-33-61	50	1.00 (oil)	0.45
42-33-68	75	1.25 (oil)	0.51

APOCHROMATIC OBJECTIVES

42-33-71	60	0.95	0.18
42-33-79	77	1.40 (oil)	0.29

HUYGENIAN EYEPIECES

Untreated

Cat. No.	Magnification
31-15-05	5
31-15-06	6.4
31-15-07	7.5
31-15-09	10.
31-15-12	12.5
31-15-15	15

Balcoted

Cat. No.	Magnification
31-05-05	5
31-05-06	6.4
31-05-07	7.5
31-05-09	10.
31-05-12	12.5
31-05-15	15

Hyperplane Eyepieces (Balcoted)

31-05-40	5
31-05-42	7.5
31-05-46	12.5
31-05-44	10.
31-05-48	15.
31-05-50	20

Compensating Eyepieces (Balcoted)

31-05-70	5
31-05-72	7.5
31-05-75	10.
31-05-76	12.5
31-05-78	15.
31-05-80	25

31-34-64-21 Tri-vert Illuminator with quadruple nosepiece; four Tri-vert, Balcoted achromatic objectives, 8X, 10X, 20X, and 40X; yellow, green, and blue filters; Polaroid Polarizer and Cap Analyzer; 6.5-v., precentered lamp; adjustable transformer for 115-v., 60 cycle A.C., in case

Filters & Objectives for Tri-vert Illuminator

Cat. No.	
42-33-63	Objective, 8X, Balcoted
42-33-64	Objective, 10X, Balcoted
42-33-07	Objective, 20X, Balcoted
42-33-66	Objective, 40X, Balcoted
31-34-96	Yellow Filter
31-34-97	Green Filter
31-34-98	Blue Filter
31-34-99	Polaroid Filter

TERMS AND PROCEDURE

CATALOG NUMBERS

When ordering, be sure to give catalog number and name of item.

FINANCIAL STANDING

To avoid delay, a purchaser with whom Bausch & Lomb has not previously transacted business should accompany his first order with commercial references or remittance in cash.

TRANSPORTATION CHARGES

Unless otherwise stated on a B&L quotation, all consumer purchases, except repairs, will be shipped transportation charges prepaid to any point within Continental United States of America. Other-than-consumer purchases, all repairs, and goods for delivery outside the above specified area will be shipped f.o.b Rochester, N. Y., U. S. A. The shipping charges on products sent on memorandum are not prepaid. There is no charge for packing unless otherwise stated. Products made on special order cannot be forwarded C. O. D.

SHORTAGE OR DAMAGE

To avoid error, Bausch & Lomb exercises the utmost care in checking and packing all shipments. All packing should be carefully examined for small items. If a discrepancy is found, report it to Bausch & Lomb immediately. Report to the transportation company at once any claim for loss, damage or breakage. Carriers are responsible for loss or damage to goods in transit. When shipping container shows damage, do not give a clear receipt, but sign for "in bad order." Save the container and obtain an inspection report from the carrier.

RETURNING GOODS

If it is desired to return goods, first send Bausch & Lomb full information by letter. Goods should not be returned for any reason until approval for their return has been received from Bausch & Lomb. Each item should be plainly tagged with sender's name and address. Identification tags will be sent on request.

ELECTRICAL EQUIPMENTS

Electrical equipments for use on voltages other than those listed are available on special order. Send complete specifications for quotations.

INQUIRIES

When writing, please give the date of your order, the Bausch & Lomb order number which appears on the packing slip and, if possible, the Bausch & Lomb invoice number.

PRICES

Prices are subject to change without notice. Orders are subject to acceptance at Rochester, N. Y., U. S. A., at prices prevailing at time of shipment. Orders for standard items may be cancelled if not wanted because of price advance. Excise taxes or other governmental charges will be added wherever applicable. Shipments to points outside Continental United States of America and to its territories, dependencies and possessions, except Hawaii and Alaska, are not subject to excise taxes. Delivery dates are estimated and cannot be guaranteed.

DESIGN CHANGES

Bausch & Lomb reserves the right to make changes in instrument design in accordance with scientific progress, and to supply apparatus resultingly different from that described or illustrated in its literature.

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BAUSCH & LOMB OPTICAL CO.

Rochester 2, New York, U.S.A.

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Price List for Catalog D-1053

BAUSCH & LOMB

Dynoptic Metallurgical Microscopes

JUNE 15, 1955

MICROSCOPES

Catalog No.	Description	Price
31-20-66-37	DM Metallurgical Microscope with monocular body; vertical illuminator; triple revolving nosepiece; illuminating unit with 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., A.C.; one 8X, one 20X, and one 40X Balcoted achromatic objectives; one 7.5X and one 12.5X huygenian eyepiece; complete in carrying case	$589.00
31-20-68-37	DMET Metallurgical Microscope with inclined binocular body; vertical illuminator; triple revolving nosepiece; illuminating unit with 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., A.C.; one 8X, one 20X, and one 40X Balcoted achromatic objectives; two paired 7.5X and two paired 12.5X huygenian eyepieces; complete in carrying case	$769.00
31-20-66-38	DMTR Metallurgical Microscope with monocular body; fitted with Tri-vert Illuminator having a quadruple nosepiece; yellow, green and blue filters; polaroid polarizer and cap analyzer; 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., 60 cycle A.C.; one 8X, one 10X, one 20X and one 40X Balcoted achromatic Tri-vert objectives; one 7.5X and one 12.5X huygenian eyepieces; complete in carrying case	$808.00
31-20-68-38	DMETR Metallurgical Microscope with inclined binocular body; fitted with Tri-vert Illuminator having a quadruple nosepiece; yellow, green, and blue filters; polaroid polarizer and cap analyzer; 6.5-v., 25.5 c.p. lamp; adjustable transformer for 115-v., 60 cycle A.C.; one 8X, one 10X, one 20X and one 40X Balcoted achromatic objectives; two paired 7.5X and two paired 12.5X huygenian eyepieces; complete in carrying case NOTE: Balcoted huygenian eyepieces are available at extra cost. The price differential is easily determined by comparing Balcoted huygenian eyepieces and those without Balcoting, in the price list.	$988.00

ACCESSORIES

Catalog No.	Description	Price
31-34-86	Compensating Lens, for adapting 31-34-82 for use with 160mm. tube length microscope	$ 9.00
31-19-37	Monocular body	18.00
31-19-97	Inclined binocular body	180.00
31-34-95	Polaroid Polarizer	17.00
31-57-11	Polaroid Cap Analyzer	12.00
31-57-45	Retardation Plate-Red 1st order, fits Cap Analyzer	16.00
31-57-44	Retardation Plate-¼ wave, fits Cap Analyzer	11.00
31-59-67-01	Mechanical Stage, graduated, in case	63.00
31-59-66-01	Mechanical Stage, ungraduated, in case	47.00
31-16-89	Stage Micrometer with scale ruled to 0.001"	18.00
31-16-90	Stage Micrometer with scale ruled to 0.1mm. and 0.01mm.	18.00
42-34-71	Micrometer Eyepiece, reads directly in thousandths of an inch on specimen	32.00
31-16-50	Filar Micrometer Eyepiece (with case — add $3.00)	87.00
42-34-68	Grain Size Measuring Eyepiece	105.00
33-16-02-04	Interference Microscope Objective, 10X, with 10% and 20% test plates NOTE: The 42-34-71 Micrometer Eyepiece is designed for use with 8X objective and monocular body tube.	150.00

VERTICAL ILLUMINATOR

Catalog No.	Description	Price
31-34-82-01	Vertical Illuminator with coated and aluminized reflector for full and half aperture illumination; field and aperture diaphragms, and filter mounted in side tube; triple revolving nosepiece	$112.00
31-34-85	Accessory lens to fit 31-34-82-01 Vertical Illuminator for external illumination	10.00
31-33-32-11	Illuminating Unit for Vertical Illuminator only, with 6.5-v., 25.5 c.p. lamp in housing; adjustable transformer for 115-v., A.C.	44.00
31-33-32-12	Illuminating Unit for Vertical Illuminator only, same as above but with fixed transformer for 115-v., 60 cycle A.C., in place of adjustable transformer	42.00
31-34-94	Green Filter for 31-34-82-01 Vertical Illuminator	6.00

VERTICAL ILLUMINATOR
(Continued)

Catalog No.	Description	Price
31-34-92	Blue Filter for 31-34-82-01 Vertical Illuminator	$ 6.00
31-31-79	Lamp, 6.5-v., 25.5 c.p., 2.75 amps., precentered, prefocused and preoriented	1.03
31-36-44	Rheostat, 115-v., A.C. or D.C. for 6.5-v. lamp	14.00
31-36-47	Fixed Transformer, 115-v., 60 cycle A.C. for 6.5-v. lamp	15.00
31-36-45	Adjustable Transformer, 115-v., 60 cycle A.C. for 6.5-v. lamp	17.00

INDEPENDENT LIGHT SOURCES

Catalog No.	Description	Price
42-44-42-65	Illuminating Unit on Pedestal Base for vertical, oblique, or substage illumination with inclination joint, water cell and filter holder, including 6-v. ribbon filament illuminator and transformer for 115-v., 60 cycle A.C.	158.00
42-46-97	Transformer, 6-v., 18 amp. (108-watt) capacity for 115-v., 60 cycle A.C.	23.00
42-46-98	Transformer, same as above but for 230-v.	32.00
42-46-91	Transformer, same as above but for 115-v., 25 cycle	47.00
42-44-85-65	Illuminating Unit, same as 42-44-42-65 above, except with clock feed arc illuminator and 4.5 amp. resistance for 115-v., D.C.	189.00
42-46-52	Resistance, 4.5 amp., 115-v., D.C.	21.00
42-46-53	Resistance, 4.5 amp., 230-v., D.C.	24.00
42-46-57	Resistance, 8 amp., 115-v., A.C. or D.C.	24.00
42-47-22-28	Water Cell and Support with holder for 2" Wratten Filters for above units	24.00
42-42-36	Lamp, 6-v., 108-w. ribbon filament	6.90

SOFT CORED CARBONS

Catalog No.	Description	Price
41-52-72-73	5.6 and 8mm. diameter, 6" long, 25 pairs	mcp 6.40
41-42-64	6.4mm. diameter, 6" long, A.C.	mcp .14

ACHROMATIC OBJECTIVES

Cat. No.	Magnification	N.A.	Working Distance in Millimeters	Price
42-33-51	5	0.10	2.40	$27.00
42-33-52	8	0.20	14.2	39.00
42-33-53	10	0.25	10.6	39.00
42-33-54	20	0.40	2.8	51.00
42-33-55	25	0.50	1.8	62.00
42-33-56	40	0.65	0.91	65.00
42-33-57	50	0.85	0.38	77.00
42-33-58	75	1.25 (oil)	0.30	97.00

FLUORITE OBJECTIVES

42-33-70	50	0.85	0.39	117.00
42-33-61	50	1.00 (oil)	0.45	168.00
42-33-68	75	1.25 (oil)	0.51	184.00

APOCHROMATIC OBJECTIVES

42-33-71	60	0.95	0.18	177.00
42-33-79	77	1.40 (oil)	0.29	290.00

HUYGENIAN EYEPIECES

Untreated			Balcoted		
Cat. No.	Magnification	Price	Cat. No.	Magnification	Price
31-15-05	5	$ 7.00	31-05-05	5	$11.50
31-15-06	6.4	7.00	31-05-06	6.4	11.50
31-15-07	7.5	7.00	31-05-07	7.5	11.50
31-15-09	10.	7.00	31-05-09	10.	11.50
31-15-12	12.5	9.00	31-05-12	12.5	13.50
31-15-15	15	11.00	31-05-15	15	15.50

Hyperplane Eyepieces (Balcoted)			Compensating Eyepieces (Balcoted)		
31-05-40	5	21.00	31-05-70	5	21.00
31-05-42	7.5	21.00	31-05-72	7.5	21.00
31-05-44	10.	28.00	31-05-75	10.	28.00
31-05-46	12.5	29.00	31-05-76	12.5	29.00
31-05-48	15.	30.00	31-05-78	15.	30.00
31-05-50	20	30.00	31-05-80	25	30.00

31-34-64-21 Tri-vert Illuminator with quadruple nosepiece; four Tri-vert, Balcoted achromatic objectives, 8X, 10X, 20X, and 40X; yellow, green, and blue filters; Polaroid Polarizer and Cap Analyzer; 6.5-v., precentered lamp; adjustable transformer for 115-v., 60 cycle A.C., in case $530.00

Filters & Objectives for Tri-vert Illuminator

Cat. No.		
42-33-63	Objective, 8X, Balcoted	$62.00
42-33-64	Objective, 10X, Balcoted	62.00
42-33-07	Objective, 20X, Balcoted	74.00
42-33-66	Objective, 40X, Balcoted	87.00
31-34-96	Yellow Filter	8.50
31-34-97	Green Filter	8.50
31-34-98	Blue Filter	8.50
31-34-99	Polaroid Filter	22.00

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